ABSTRACT

The statistical quality control charts are designed to detect shifts in process due to assignable causes of variation. In the monitoring phase of a process the in-control and out-of-control state of the process identified through control charting structures. The control charts are designed with respect to different statistical measures such as: mean, range, variance and proportions. The different charts are of Shewhart type and memory types such as: Cumulative Sum (CUSUM) and Exponentially Weighted Moving Average (EWMA) control charts. The memory control charts are extensively used for monitoring the process for the disturbances in process mean and variance at the small shifts. The control charts are designed under the classical as well as Bayesian setup to increase the efficiency of charts for the detection of the faults in the process. The Bayesian control charts are designed when process parameters are assumed as random. This study introduces a new class of memory type control chart under Bayesian setup to effectively handle the uncertainty of the process parameters. A new Bayesian double homogeneously moving average (DHWMA_B) chart is designed to monitor the efficiency of process mean. The under study variable is normally distributed with unknown mean and known variance. To find the posterior distribution, we use normal as prior distribution of the sample mean. The simulation study is used for the generation of random samples for different sample sizes. The different values of the smoothing constant are selected to check the efficiency of chart at small shifts. For the comparison with some other charts we also constructed them under Bayesian setup to check the competitive efficiency of the chart under classical and Bayesian setup. The individual performance measures of ARL, SDRL and MDRL are computed for performance comparison. The results reveal that the purposed DHWMA_ B chart is efficient for the detection of disturbances in process mean at small shifts at different smoothing constant for the different sample sizes (Ctrl) ▾